18-P-97905

FINAL REPORT

Health Care Financing Administration

Grant Number 18-P-97905

Joanna Lion, Ph.D., Principal Investigator

Alan Malbon, Systems Analyst

Robert Friedman, M.D., Medical Consultant

Mary G. Henderson, Research Analyst

Heller School, Brandeis University

"The Relationship of Physician Medicaid Reimbursement in Private Practice and Hospital Outpatient Departments to Actual Costs of Providing Care"

The support of the Health Care Financing Administration is gratefully acknowledged. The interpretations of the findings in this report are those of the principal investigator and do not necessarily reflect HCFA policies.

Introduction

The objective of this study was to examine the reasons for the higher cost of outpatient care compared to care delivered by physicians in private practice. The study attempted to determine the extent to which diagnoses differ in these settings and the extent to which these differences generate cost differences. In addition, the study attempted to determine if some or all of these cost differences can be attributed to differences in the types of patients treated. These findings may influence HCFA policy regarding reimbursement of outpatient care.

The actual project title is somewhat of a misnomer since the Medicaid reimbursement portion was removed prior to funding as it overlapped with work being done by another grantee. The focus of this study, then, is on case mix in OPD's and private practice as it relates to costs to physician time, ancillary services, and actual cost of the setting.

Case Mix

Hypothesis - The initial hypothesis here was that hospital OPD patients were much sicker and more difficult to treat than were patients in private practice.

In general, we were able to demonstrate that medical case mix is only slightly more complex in the hospital OPD than in a private physician's office. The details of this work are explained in two of the attached publications (Lion, 1981; Lion and Altman, 1982). A secondary data base developed at the University of Southern California by Robert Mendenhall was used for the analysis.

It should be remembered that the findings - about 5 to 15 percent more complex - are based upon an autogrouping technique originally designed for visits to private practitioners so that variables important to OPD patients - such as presence of a social problem - are not included. In addition, the data are limited to four primary care specialties - general practice, family practice, pediatrics, and internal medicine - which constitute only slightly over half of the visits to OPD's (56 percent) as measured by weighted OPD visits in the USC-Mendenhall tapes.

Since we were not able to demonstrate substantial medical case mix differences despite strong anecdotal evidence, we then investigated social case mix by doing our own data collection effort in three Boston teaching hospital primary care OPD's. Unlike the mostly unproven differences for medical case mix between hospital OPD's and private practice, strong differences in patients with social problems have consistently been shown to exist between the two sites. What had not been demonstrated is whether or not patients with social problems use more OPD resources. Our findings are explained in the attached chapter of a book now pending publication (Lion and Williams, 1983).

Briefly, we found that patients who had social problems when they were seen in the OPD used only a small amount more physician time than those without social problems. When all direct provider time - including nurse practitioners, social workers, and translators - was factored in and adjustments made for the differences in value of senior physician time and resident time, however, this differential grew to about 25 percent. Both of these findings assume that the medical case mix is the same for hospital OPD patients with and without social problems.

Standardizing for diagnosis reveals that while the overall differential holds true, there is wide variety in the percent of patients with a given diagnosis who have a social problem and in the difference a social problem makes in the amount of additional resources used. The most common diagnosis - hypertension - showed virtually no differences, for example.

Put together, the findings on medical and social case mix indicate that only a minority of the additional cost per visit of going to an OPD can be laid at the doorstep of more complicated case mix, at least for primary care OPD's. An on-going data collection effort, as is presently the case for inpatient hospital care, would aid greatly in pinpointing the types of hospital OPD's which bear the brunt of more complex case mix (Lion and Malbon, 1983, attached.)

Costs

Per Visit Costs

Hypotheses - There were four hypotheses related to costs independent of case mix:

1) That per visit costs in hospital OPD's would be considerably higher than per visit costs in private fee-for-service groups.

2) That indirect costs coming down into the OPD from overhead would account for the majority of the cost differential between OPD's and private practice.

3) That the portion of the overhead costs due to hospital costs which had no counterpart in private practice would be substantial.

4) That costs per visit would rise for both hospital OPD's and private practices up to an optimal size and would then decline.

Only the first of these hypotheses could be supported. In coming to our conclusions, we used two secondary data bases. The California Health Facilities Commission provided cost data on 106 short term general hospitals

in California which had an organized outpatient department. The Medical Group Management Association provided cost data on 122 private group practices throughout the country. These group practices had a minimum of three physicians and a mean of 24 physicians. All comparisons in this section of the annual report exclude the cost of physician time, which is not available on the California cost reports, and the cost of ancillary services.

When comparing cost per visit, we found a substantial average cost difference between the hospital OPD and private group practice. The hospital OPD per visit nonphysician cost averaged $36.92 and the group practice nonphysician cost averaged $22.17.

Rather than overhead accounting for this difference, however, most was due to salary costs in the OPD being twice as high as those in the group practice sites. The majority of these salary costs were direct costs (75 percent of total salary costs). In other words, increased overhead does not appear to account for most of the across-site difference.

Noncounterpart OPD costs averaged slightly over $3.00 per visit, or 8 percent of total nonphysician average cost. In large hospitals, noncounterpart costs accounted for almost $5.00 per visit, a substantial amount in absolute terms although not in percentage terms. One component of noncounterpart costs - those due to research and education activities - were found to be significant only in large teaching hospitals. In these hospitals, research and education costs were over $2.00 per visit.

The size of the site affected the cost per visit in the hospital OPDs, with large hospitals having average costs roughly twice as high as small hospitals. Group practice costs were not found to vary as dramatically by size of the practice as measured by the number of full-time physicians. Large groups had costs about 25 percent higher than small groups.

A detailed discussion of all of these findings, complete with tables, is included in the attached chapter of a book now pending publication (Henderson and Hannon, 1983.).

Ancillary Services

Hypothesis - The major hypothesis here was that laboratory tests, radiological procedures, and other diagnostic and therapeutic procedures would be used more and would cost more in hospital OPD's than in private practice. Part of this hypothesis was not borne out and part proved to be untestable.

Relative value units were attached to all diagnostic and therapeutic procedures collected by USC-Mendenhall and were summed by converting to 1980 dollars for pathology, radiology, medical procedures, and surgical procedures. The methodology is shown in the attached protocol by Friedman. The cost of prescriptions is excluded from the analysis, since insufficient data were available to attach values to unspecified drugs.

Somewhat to our surprise, the USC-Mendenhall data indicated little difference in the total value of diagnostic and therapeutic procedures done by private practitioners and by residents and salaried staff physicians. Those found were not in the expected direction. That is, private practitioners were performing a slightly more expensive battery of tests, in their overall patient load, than were hospital based physicians. Furthermore, when case mix was adjusted for, this difference increased so that private physicians were over-ordering diagnostic and therapeutic procedures relative to the OPD physicians.

By Specialty

Table 1 reflects these findings for all four specialties under consideration before adjusting for medical case mix. In general, physicians in private practice, regardless of specialty, order slightly more tests than their hospital based counterparts.

Using internists as an example, those salaried in the OPD used 3.8 percent fewer diagnostic and therapeutic procedures than did their counterparts in private practice. Most of the difference was in medical procedures; OPD physicians were actually higher in laboratory procedures. Residents in internal medicine used only 1.9 percent fewer procedures. Medical procedures consist of ECG's, EEG's, pulmonary function tests, skin tests for allergy, adiometry, tonometry, and developmental screens.

It is striking that internists order or perform tests worth about twice as much per patient visit as do physicians in family practice and general practice; this difference holds across all three settings. In the case of salaried internists in the OPD, in fact, the difference approaches two and one half times as much. If this differential holds when diagnosis is controlled for, it is of enormous importance for reimbursement policy. This issue will be explored in the next section. Pediatricians have by far the lowest ancillary costs per visit, probably because they treat a considerably healthier population.

Table 2 presents the same findings adjusted for medical case mix by using autogrouping. The AVG's used are the same as those used by Lion and Altman when they reported their findings of 5 to 15 percent case mix differences. This table gives the relative value unit dollar equivalents which would have been expended by each group of physicians if the proportion of their case mix

Table 1

Mean actual value of all diagnostic and therapeutic procedures ordered or performed by site of ambulatory care by specialty

Specialty and type of practice	Mean actual value	Percent by specialty			
		Medical	Surgical	Radiology	Pathology
Private practice					
Internal medicine	$30.92	30%	5%	25%	40%
Pediatrics	6.50	18	17	10	55
Family practice	15.34	38	22	14	26
General practice	15.32	38	23	14	25
Salaried hospital staff					
Internal medicine	29.75	14	9	26	50
Pediatrics	6.47	25	11	15	49
Family practice	14.36	25	24	18	33
General practice	15.32	33	26	9	32
Residents					
Internal medicine	30.32	24	4	26	46
Pediatrics	7.15	21	11	10	58
Family practice	11.67	26	22	17	35
General practice	12.38	17	20	15	48

in each of the ambulatory visit groups were treated with diagnostic and therapeutic procedures representing the norm for all patients from all physicians in that group.

If a physician group has a higher expected cost of tests in Table 2 than his actual cost of tests in Table 1, this means that he is treating his particular case mix with fewer tests than the group as a whole would warrant for that same case mix. Conversely, if his actual cost is higher than his expected cost based on his case mix, he is using more tests than would be expected. Appendix A works through a simplified version of this technique so that the mathematics can be understood.

A comparison of Tables 1 and 2 leads to the finding that private practitioners are actually ordering and performing slightly more tests than would be expected given their case mix and hospital based physicians somewhat fewer. Previous evidence in much more restrictive settings compared hospital OPD's and free standing clinics (Gold 1979, Gorry 1978) and found virtually no differences. Ours, while small, are consistent across specialties. These findings, it should be recalled, are based upon autogrouping of all cases.

One possible explanation for the anecdotal evidence favoring more tests in a hospital setting may be that more of the tests are actually performed there. Private physicians tend to order tests which may be performed outside of their offices, possibly at no profit to them. These tests are indicated in our analysis. Another possibility may be that most comparisons count all tests as equal while our relative value unit method gives more weight to more expensive tests. Actually, subsequent analysis has shown that for both internists and GP's hospital based physicians are performing tests on more of their patients. When private practitioners do order tests, however, they order more of them or more expensive ones.

Table 2

Mean expected value of all diagnostic and therapeutic procedures ordered or performed, adjusted by site of care for case mix using autogrouping

Specialty and type of practice	Mean expected value	Percent by specialty			
		Medical	Surgical	Radiology	Pathology
Private practice					
Internal medicine	$30.51	29%	5%	25%	41%
Pediatrics	6.46	19	16	10	55
Family practice	15.01	36	22	15	27
General practice	15.22	37	23	14	26
Salaried hospital staff					
Internal medicine	34.79	27	5	26	43
Pediatrics	6.47	25	11	15	49
Family practice	14.30	34	20	16	29
General practice	13.74	33	19	14	34
Residents					
Internal medicine	32.01	27	5	26	42
Pediatrics	7.02	21	16	10	53
Family practice	14.43	35	22	16	27
General practice	14.02	34	21	14	30

By Diagnosis

Individual diagnoses can also be singled out for comparison. Costs of diagnostic and therapeutic procedures would, of course, be expected to vary by diagnosis. Diabetics, for example, would be expected to have more laboratory tests than would hypertensives. Even with a data set as large as USC-Mendenhall, it is not possible to examine more than a few leading diagnoses because cell size dwindles quite rapidly. Table 3 gives the percent of visits with tests ordered or performed for four leading diagnoses - hypertension, diabetes, neuroses, and upper respiratory infections - for internal medicine. Table 4 replicates this for general practitioners.

A few important points emerge from Tables 3 and 4.

1) Diabetics are much more apt to have a test ordered during a given visit than are patients with the other three diagnoses. Fully 80 percent of diabetics had at least one test compared with roughly 40 percent for the other three diagnoses.

2) General practitioners are much less likely to order a test for a given diagnosis than are internists. The only exception to this appears to be residents, who appear to have much the same habits regardless of specialty. Residents tend to have a higher proportion of new patients, for whom they may need baseline test data.

3) There is no other discernable pattern in the table, with physicians in private practice ordering tests on more of their patients for some diagnoses and on fewer for others compared to hospital based physicians. This is surprising in view of the finding that private practitioners order a package of tests which are more expensive overall than those ordered by hospital based physicians. A possible explanation is that they order the same quantity of tests but more expensive versions of them; for example, a blood chemistry instead of a CBC.

The percentages indicated in Tables 3 and 4 appear to have considerable validity when compared as closely as possible with those obtained by the National Ambulatory Medical Care Survey (NAMCS). It must be kept in mind that test data for NAMCS is not reported by specialty but rather for all specialties combined. On a diagnosis-specific basis USC-Mendenhall is slightly lower for percent of patients with a specific diagnosis having a test performed at time

Table 3

Percent of visits with a diagnostic or therapeutic procedure ordered or performed for four leading diagnoses

	Internal Medicine					
	Medical	Surgical	Radio-logical	Patho-logical	All procedures(1)	Total number of cases
Private practice						
Hypertension	19.6 %	1.5%	16.2%	30.5%	36.2 %	1,930
Diabetes	15.2	1.9	13.6	78.3	80.8	1,808
Neuroses	19.2	2.7	22.0	31.8	41.3	787
Upper respiratory infection	8.7	1.0	8.0	29.5	38.7	630
All diagnoses	21.4	3.4	20.9	39.2	53.6	15,366
Salaried staff physician						
Hypertension	16.5	(2)	18.4	46.7	49.5	103
Diabetes	9.4	(2)	(2)	78.1	79.7	64
Neuroses	14.6	(2)	(2)	33.3	35.4	48
Upper respiratory infection	(2)	(2)	(2)	44.4	44.4	36
All diagnoses	12.1	5.3	22.1	45.5	60.6	903
Residents						
Hypertension	11.1	(2)	7.9	24.6	28.6	126
Diabetes	30.7	(2)	13.9	78.4	80.0	65
Neuroses	14.6	(2)	17.1	29.3	39.0	41
Upper respiratory infection	8.8	(2)	(2)	45.6	41.2	68
All diagnoses	19.8	3.3	20.1	41.3	55.5	966

(1) Adds to less than total of all four sub-categories since a patient may have had more than one diagnostic or therapeutic procedure during a visit.

(2) Less than 5 cases with tests in this category.

Table 4

Percent of visits with a diagnostic and therapeutic procedures ordered or performed for four leading diagnoses

General Practice

	Medical	Surgical	Radio-logical	Patho-logical	All procedures(1)	Total number of cases
Private practice						
Hypertension	5.6%	(2)	3.2%	16.0%	19.7%	806
Diabetes	9.4	(2)	(2)	53.8	56.1	392
Neuroses	9.5	1.2	2.4	16.6	24.8	423
Upper respiratory infection	15.7	.1	1.8	18.5	31.6	763
All diagnoses	12.9	8.2	6.1	18.3	37.3	12,055
Salaried staff physician						
Hypertension	(2)	(2)	(2)	32.2	33.9	59
Diabetes	(2)	(2)	(2)	40.0	41.0	100
Neuroses	(2)	(2)	(2)	(2)	(2)	44
Upper respiratory infection	(2)	(2)	(2)	29.9	32.8	67
All diagnoses	8.3	7.0	3.9	27.7	40.5	712
Residents						
Hypertension	11.1	(2)	11.1	39.5	44.4	81
Diabetes	(2)	(2)	(2)	88.4	95.1	43
Neuroses	22.2	(2)	(2)	22.2	42.2	45
Upper respiratory infection	(2)	(2)	(2)	15.8	17.9	95
All diagnoses	8.5	5.9	5.3	28.6	39.7	997

(1) Adds to less than total of all four sub-categories since a patient may have had more than one diagnostic or therapeutic procedure during a visit.

(2) Less than 5 cases with tests in this category.

Table 5

Comparison of data from National Ambulatory Medical Care Survey on percent of tests for specific diagnoses with data from USC-Mendenhall

Diagnosis	NAMCS-all private practitioners[1]	USC-Mendenhall private practitioners[2]			
		Primary practitioners	Internal medicine	General practice	Family practice
Hypertension					
Lab test	22.7 %	19.0 %	30.5 %	16.0%	16.6 %
X-ray	5.1	5.2	13.6	3.2	2.3
Diabetes					
Lab test	69.0	58.5	78.3	53.8	51.9
X-ray	4.5	2.8	13.6	0.3	1.2
Neurosis					
Lab test	8.6	19.6	31.8	16.6	16.0
X-ray	3.1	6.5	22.0	2.4	4.7
Upper respiratory infection					
Lab test	25.3	20.9	29.5	18.5	20.6
X-ray	3.6	3.0	8.0	1.8	1.5
All diagnoses					
Lab test	23.2	30.0	41.3	28.6	16.0
X-ray	8.2	8.3	20.1	5.3	5.6

(1) NAMCS is sampled proportionately to physicians in private practice throughout the U.S. Of these, 41.3 percent are general or family practioners and 10.9 percent are internists.

(2) Mendenhall is similarly sampled, but we do not have available the other 47.8 percent of subspecialists who may treat these diagnoses. We have however combined the three practitioner sets we do have with their appropriate weights to get back to a usable figure for what we have called primary practitioners. Each visit to a GP in private practice in this set represents visits to 130.91 GP's; to an FP, 17.37, and to an internist 36.96. General and family practitioners thus comprise 80.0 percent of our USC-Mendenhall weighted sample and internists 20.0, almost exactly their weighting in NAMCS if other practitioners could be included in our USC-Mendenhall analysis.

of visit, as indicated in Table 5. Only neurosis shows higher percents of patients with procedures ordered or performed in the USC-Mendenhall data set. This is because psychiatrists, who rarely order lab tests or x-rays, are included in NAMCS but not in our analysis of USC-Mendenhall. For all diagnoses combined, use of x-rays is almost identical between the two data sets and use of lab tests somewhat higher in USC-Mendenhall. This comparison with NAMCS is highly encouraging with regard to the integrity and generalizability of the USC-Mendenhall data set.

The actual costs of tests on a diagnosis specific basis is shown in Table 6 for internal medicine and Table 7 for general practice. Taken together, these two tables show one finding of striking policy importance and one equivocal finding.

Of great value to those setting third party reimbursement is the finding that general practitioners order tests which cost much less for the same diagnosis than do internists. This difference is nearly four fold for hypertension and three times as much for diabetes. Again, residents are the exception, with the general practice residents not much lower than those in internal medicine.

The finding which is more difficult to understand or explain is that, while private practitioners appear to order a more expensive bundle of tests overall than hospital based physicians, this cannot be borne out by examining the four diagnoses we have chosen. Private practitioners are, in fact, the highest for only one - neuroses for internal medicine and upper respiratory infection for general practice. While an extensive AVG analysis is beyond the purview of this grant, we will examine this anomaly in more detail in the next section since the integrity of the AVG system is of such potential policy importance.

Table 6

Dollar value of visits for diagnostic or therapeutic procedures ordered or performed for four leading diagnoses

	Internal Medicine					
	Medical	Surgical	Radio-logical	Patho-logical	All procedures[1]	Total number of cases
Private practice						
Hypertension	$ 6.74	$ .73	$ 4.70	$11.22	$23.39	1,930
Diabetes	5.37	1.47	3.69	24.76	35.29	1,808
Neuroses	8.21	1.80	8.98	12.13	31.12	787
Upper respiratory infection	1.25	.12	1.92	5.93	9.22	630
All diagnoses	9.33	1.46	7.68	12.45	30.92	15,366
Salaried staff physician						
Hypertension	7.61	4.42[2]	5.75[2]	17.06	34.84	103
Diabetes	2.70	.39[2]	2.41[2]	21.66	27.16	64
Neuroses	4.80	--	8.61	12.23	25.64	48
Upper respiratory infection	--	--	.59[2]	8.06	8.65	36
All diagnoses	4.21	2.82	7.86	14.86	29.75	903
Residents						
Hypertension	7.23	--	2.72	7.85	17.80	126
Diabetes	5.69	--	4.88	27.12	37.69	65
Neuroses	2.41	1.96[2]	7.38[2]	8.46	20.21	41
Upper respiratory infection	1.09	--	1.75[2]	8.15	10.99	68
All diagnoses	$ 7.15	$ 1.18	$ 7.98	$14.01	$30.32	966

(1) Adds to less than total of all four sub-categories since a patient may have had more than one diagnostic or therapeutic procedure during a visit.

(2) Based on less than 5 cases with tests in this category.

Table 7

Dollar value of visits for diagnostic or therapeutic procedures ordered or performed for four leading diagnoses

	General Practice					
	Medical	Surgical	Radio-logical	Patho-logical	All procedures(1)	Total number of cases
Private practice						
Hypertension	$ 1.28	$ (2)	$ 1.04	$ 3.86	$ 6.33	806
Diabetes	1.19	(2)	(2)	14.39	15.83	392
Neuroses	1.75	.38	.81	3.51	6.45	423
Upper respiratory infection	1.29	.09	.41	3.17	4.96	763
All diagnoses	5.88	3.49	2.18	3.78	15.32	12,055
Salaried staff physician						
Hypertension	(2)	(2)	(2)	4.29	5.54	59
Diabetes	(2)	(2)	(2)	8.32	9.44	100
Neuroses	(2)	(2)	(2)	(2)	(2)	44
Upper respiratory infection	(2)	(2)	(2)	4.34	4.90	67
All diagnoses	4.72	3.73	1.27	4.63	14.35	712
Residents						
Hypertension	3.35	(2)	2.78	8.72	14.84	81
Diabetes	(2)	(2)	(2)	28.39	31.06	43
Neuroses	3.47	(2)	(2)	3.69	10.12	45
Upper respiratory infection	(2)	(2)	(2)	2.64	3.03	95
All diagnoses	$2.09	$2.50	$1.82	$ 5.96	$10.82	997

(1) Adds to less than total of all four sub-categories since a patient may have had more than one diagnostic or therapeutic procedure during a visit.

(2) Based on less than 5 cases with tests in this category.

By Ambulatory Visit Group

Another way of analyzing diagnosis is to use individual AVGs. This controls for such factors as whether it is a new or returning patient and a new or previously confirmed diagnosis. Holding diagnosis constant, new patients and old patients with a new diagnosis would be expected to use more tests than old patients with a previously confirmed diagnosis. Autogrouping expresses this concept when it splits on these variables as well as on major diagnostic category and other diagnosis related variables.

Of the leading diagnoses, only essential hypertension falls into a few specific final ambulatory visit groups (AVG's). Diabetes, neuroses, and upper respiratory infections fall into many final AVG's, usually giving cell sizes too small to permit analysis. Also, it should be remembered that major diagnostic categories, the starting point of AVG's, are not synonymous with diagnoses. Diabetes, for example, is autogrouped with other diseases of the endocrine and metabolic system so that the final AVG's, when not too small, are too vague, containing other diagnoses as well.

Table 8 indicates the findings for the hypertension AVG's.

Three final AVG's are shown:

	Description of AVG's	Number of visits Internists	G.P.'s
AVG 42	A primary diagnosis of hypertension in a new patient who was not referred	142	50
AVG 48	A primary diagnosis of hypertension in an old patient who is making a revisit for this diagnosis	1,543	641
AVG 55	A primary diagnosis of hypertension in an old patient who has come in with a new problem	418	230
	Total visits for hypertension	2,103	921

These three AVG's capture 97 percent of the hypertensives seen by both internists and GP's. The majority of the visits for both groups are concentrated among already diagnosed hypertensives coming for a return visit to a practitioner they know. Of the newly diagnosed hypertensives, a minority are new patients; most are already known to the practitioner and have the problem detected on a routine visit.

How do internists and general practitioners order tests and therapeutic procedures for these patients? Table 8 indicates that, as expected, internists are considerably more expensive than GP's in treating the same diagnosis. This discrepancy is as high as ten-fold ($64.72 versus $5.51) in the case of visits by a patient not previously known to have hypertension and not previously seen by the physician.

While this issue is of great policy importance, it is not central to our own concern with the differences within the same specialty between private practitioners and hospital based physicians. Unfortunately, Table 8 is not illustrative of our overall findings in this area, that is, our overall AVG analysis found private practitioners to be ordering slightly more weighted tests, given their diagnostic mix, than were salaried hospital based physicians.

We had hoped to illustrate this, using one diagnostic set of AVG's. This is true for only one of the three hypertension AVG's; however, for a second, the figures are similar for all three groups, and for a third, salaried hospital physicians, but not residents, ordered a more extensive set of tests. In retrospect, this is not surprising since hypertension overall was shown in Table 6 to not conform to this overall pattern. Our selection of it, however, was predicated upon its being split into relatively few final AVG's. Further

Table 8

Mean dollar values for ancillary services for visits for hypertension in three ambulatory visit groups

	AVG 42		AVG 48		AVG 55	
	Visits	Costs	Visits	Costs	Visits	Costs
Private practitioners						
Internal medicine	119	$64.72	1,413	$18.83	361	$24.31
General practice	40	5.51	548	5.33	196	7.90
Salaried staff physicians						
Internal medicine	19	93.60	74	19.61	6	10.67
General practice	3	15.29	42	6.07	13	2.00
Residents						
Internal medicine	6	24.73	63	20.94	52	9.45
General practice	7	31.42	51	13.93	21	12.96
All cases						
Internal medicine	144	66.86	1,550	18.95	419	22.27
General practice	50	9.96	641	6.06	230	8.05

work will continue to be done with these findings. One likely hypothesis is that the differences which tip the scale toward the greater expensiveness of tests in private practice occur in a large number of small, relatively uncommon diagnostic groups.

The Cost of Physician Time

We have already seen that the value of ancillary services varies for a visit of the same diagnosis depending upon the specialty of the physician as well as upon whether the physician is in private practice or is based in a hospital OPD. Previously, we had found (Lion and Altman, 1982) that the time a physician takes to see a patient with the same diagnosis varies by specialty as well as by site of practice. If this time could be quantified as a monetary value, it could be added to the value of tests to give a site specific figure approximating cost. This would be the physician direct cost of the visit. In order to quantify the value of physician time, we need to know two factors:

1) The number of hours per week the physician spends on direct patient care.

2) The amount the physician earns from direct patient care.

Detailed data on the physician work week is available from the USC-Mendenhall diary portion of that study. We have run that portion separately for physicians in private practice in groups of three or more physicians, a definition which coincides closely with that for data available from the Medical Group Management Association. These data are compared with the diary data for all salaried staff physicians in Table 9.

Internists in private practice claimed they worked slightly shorter work weeks than salaried OPD internists (52.8 hours versus 55.8 hours) but that more of those were used in direct patient care (40.8 hours versus 36.0 hours).

Table 9

Number of Hours of Direct Patients Care
and of Other Professional Activities for Internists, 1978[1]

Professional Activity	Hours per day by type of practice arrangement: Group of three or more private practitioners	Institutional salaried physicians
Patient care		
Office exams and treatments	3.5	0.8
Telephone assessments, with or without Rx	0.5	0.1
Hospital patient care	2.2	3.6
Other patient care	0.6	1.5
Total patient care	6.8	6.0
Other professional		
Teaching and research	0.3	1.1
Other	1.0	1.8
Administration	0.8	0.5
Subtotal (professional activities excluding "on call" and travel)	8.8	9.3
Travel time	0.7	0.6
Personal, on call	2.6	2.3
Personal, not on call	11.8	11.7
Total hours per day	24.0	24.0

(1) Data collected over two three-day periods, Monday through Wednesday and Thursday through Saturday. Data represents one typical day, excluding Sunday, and excludes internists who are on vacation, are ill or are otherwise not practicing. The means thus represent a six day work week for a full time physician.

Because of this, private internists were estimated to spend 77 percent of their time on direct patient care compared with 65 percent for salaried staff internists. Resident data was obtained from the American Medical Association, which was able to provide data for private internists and general practitioners as well using a slightly different definition.

If all physician income is assumed to be derived from patient care, the value of the physician's time per minute can be calculated by dividing direct patient care time into the physician's net practice income in the case of private practitioners and salary in the case of hospital based physicians.

Table 10 indicates 1980 net incomes for the four specialties by site of practice along with the net cost of the physician's time per minute. Physicians are assumed to earn their net incomes during the time they are actually seeing patients or performing other direct patient care duties. Private practitioners do this 91 percent of the time compared with 65 percent of the time for salaried staff practitioners and 79 percent for residents.[1] Because of this, the value of a minute of salaried staff physician time is considerably higher than if a straightline method had been used.

Physician Direct Costs by Diagnosis

This section combines the work of the previous sections to apply values to visits for specific diagnoses. For simplification, only two specialties - internal medicine and general practice - and two diagnoses - hypertension and

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[1]These figures should be considered approximates since they are taken from two separate sources (USC-Mendenhall and AMA) and are subject to bias. USC-Mendenhall, using more stringent criteria, found a lower rate - 77 percent - for private practitioners.

Table 10

The value of physician time by specialty and site

Specialty and site	Annual net earnings[1]	Hours per week	Percent in direct patient care	Value of a minute of time
Private practice[2]				
Internal medicine	$84,582	52.2	91%	$.61
Pediatrics	67,044	48.4	91	.52
Family practice General practice	68,820	48.2	92	.53
Salaried staff physicians[3]				
Internal medicine Pediatrics	62,900	59.4	65	.55
Family practice General practice	52,350	59.4	65	.46
Residents[4]				
Internal medicine Pediatrics Family practice General practice	20,226	71.4	79	.12

(1) Includes fringe benefits

(2) Private practice physician data from AMA Periodic Survey of Physicians, 1979.

(3) Salaried staff physician earnings from Owens, Arthur, "Hospital Jobs vs. Private Practice," Medical Economics, May 10, 1982. Other data from Mendenhall diary.

(4) Resident data from Hough, Douglas E., "The Economic Status of Resident Physicians: Results from the Survey of Resident Physicians, AMA Profile of Medical Practice, 1981.

upper respiratory infections - will be used. These diagnoses are less than ideal in terms of illustrating test use in the overall direction found for all diagnoses combined but it should be remembered that the differences by site of care are quite small. In any case, these are among the very few diagnoses which give us cell sizes large enough to be useful at this stage of the analysis.

Table 11 builds upon the previous tables to produce these physician direct costs. It can immediately be noted that general practitioners not only have a lower value for a minute of time and order a less expensive set of tests than do internists but also see their patients for a shorter period of time. The end result is to make for considerably lower physician direct costs for hypertension and upper respiratory infections among general practitioners than among internists.

Overall Model with Estimated Total Costs

Table 12 builds upon the work of Henderson and Hannon cited earlier in order to provide estimates for visits for hypertension in small and large private practitioner groups and small and large hospital OPD's. Small private practitioner groups have no more than 10 full time equivalent physicians practicing in them; large groups have at least 22.5 physicians. OPD's in small hospitals are those in hospitals with fewer than 130 beds; large hospital OPD's are those in hospitals of at least 300 beds.

Limitations of the Model

There are, of course, a number of limitations to this model, some of them due to its nature and others to the lack of available data. In particular, the visit and test data are coming from one source (USC-Mendenhall), the cost of

Table 11

Cost of physician time plus cost of ancillary services compared by specialty and site for two diagnoses

Specialty and site	Minutes per visit(1)	Value of a minute of time	Cost of physician time	Cost of tests	Total physician direct cost
		Hypertension			
Private practice					
Internal medicine	17.6	$.61	$10.74	$23.39	$34.13
General practice	12.0	.53	6.36	6.33	12.69
Salaried staff physicians					
Internal medicine	17.2	.55	9.46	34.84	44.38
General practice	12.4	.46	5.70	5.54	11.24
Residents					
Internal medicine	21.2	.12	2.54	17.80	20.34
General practice	17.5	.12	2.10	14.84	11.62
		Upper respiratory infections			
Private practice					
Internal medicine	12.9	.61	7.87	9.22	17.09
General practice	10.1	.53	5.35	4.96	10.31
Salaried staff physicians					
Internal medicine	14.4	.55	7.92	8.65	16.57
General practice	10.5	.46	4.83	4.90	9.73
Residents					
Internal medicine	11.3	.12	1.36	10.99	12.35
General practice	14.5	.12	1.74	3.03	4.77

(1) From USC-Mendenhall.

Table 12

Simulated total cost of a visit for hypertension by specialty and site

Specialty and site	Physician time	Tests	Facility direct	Counterpart Plant	Counterpart Other	Non counterpart	Total facility	Grand total
Private practice								
Small group								
Internal medicine	$10.74	$23.39	$14.38	$5.67			$20.05	$54.18
General practice	6.36	6.33						32.74
Large group								
Internal medicine	10.74	23.39	17.30	7.78			25.08	59.21
General practice	6.36	6.33						37.77
Salaried staff physicians								
Small OPD								
Salaried in internal medicine	9.46	34.84	13.21	4.14	$4.97	$2.49	24.81	69.11
Salaried in general practice	5.70	5.54						36.05
Resident in internal medicine	2.54	17.80						45.15
Resident in general practice	21.0	14.84						41.75
Large OPD								
Salaried in internal medicine	9.46	34.84	30.79	7.62	6.21	4.79	49.41	93.71
Salaried in general practice	5.70	5.54						60.65
Resident in internal medicine	2.54	17.80						69.75
Resident in general practice	2.10	14.84						66.35

visit data from a variety of other sources (American Medical Association, Medical Economics, Council on Teaching Hospitals), the cost of test data from yet another source (Medicare Directory of Prevailing Charges for California) and the facility portion of the charges from two entirely different sources (the Medical Group Management Association for the private physician groups and the California Health Facilities Commission for the hospital OPD groups).

While we have tried to match all these sources as closely as possible, for example to fiscal year 1980, the possiblity of spurious precision is strong. Even while arguing that small differences in the model should be disregarded, the magnitude of most of the differences is so great that we feel we have provided a basis for thoughtful comparison for what would be involved if outpatient care were to be reimbursed by third party payers on a diagnostic specific basis.

Three potentially important portions of the model are absent. One is the cost of prescribed drugs, which could not be estimated from the sketchy data available in USC-Mendenhall. Another is the differential generally acknowledged to exist between the cost of lab tests ordered by a private physician and done in his office or in a commercial laboratory such as Metpath or Damon and the higher cost of the same test done in a hospital laboratory. If we had been able to obtain these data, rather than attributing the same cost per RVU regardless of location, the great difference we show between delivering care in private practice and in the OPD would have almost certainly been further increased.

A third omission is the differential in net earnings between board certified and non-board certified internists. While the potential existed to obtain these data both from USC-Mendenhall and from Medical Economics, the confounding effects were sufficiently great that we decided against this.

Table 13 indicates the hierarchy of costs which would be incurred in treating the same diagnosis - hypertension - in different settings. There is approximately a threefold difference from the lowest to the highest cost visit. Specialty, site, and size of site all interact in producing the hierarchy; the lowest cost visits are all to general practitioners and the highest to internists in an OPD setting or to a general practice (actually, in this case, family practice) resident in a large OPD.

It should not be inferred that most of the difference between the $32.74 for a hypertension visit to a general practitioner in a small private practice and the $93.71 to a salaried internist in a large OPD is due to the cost of the OPD. Actually, as a proportion of overall cost, the facility portion is relatively less, due to the much greater cost of tests ordered by an internist in the OPD setting. The components of care break down this way:

Portion of cost due to:	General practitioner in small private practice		Salaried internist in large OPD	
Physician time	$ 6.36	19.4%	$ 9.46	10.1%
Tests	6.33	19.3	34.84	37.2
Facility costs	20.05	61.3	49.41	52.7
Total	$32.74	100.0%	93.71	100.0

Another way of putting this is that physician time costs are about 70 percent higher for the internist in the OPD, facility costs are 150 percent higher, and test costs are 450 percent higher.

Table 13

Hierarchy of costs of a visit for hypertension, by specialty and site, from lowest to highest

Specialty	Site of practice	Cost per visit
General practitioner	Small private	$ 32.74
Salaried general practitioner	Small OPD	36.05
General practitioner	Large private	37.77
Resident in general practice	Small OPD	41.75
Resident in internal medicine	Small OPD	45.15
Internist	Small group	54.18
Internist	Large private	59.21
Salaried general practitioner	Large OPD	60.65
Resident in general practice	Large OPD	66.35
Salaried internist	Small OPD	69.11
Resident in internal medicine	Large OPD	69.75
Salaried internist	Large OPD	93.71

The cost of a visit for an upper respiratory infection is somewhat less than the cost for hypertension. This is because tests are substantially cheaper and provider time somewhat shorter. A visit to a resident in a small OPD for an upper respiratory infection costs only $29.58 compared with a high of $65.98 for a salaried internist in a large OPD. Thus, while the cost of a visit for hypertension nearly triples depending upon site of care and practitioner, the cost of a visit for an upper respiratory infection merely doubles.

The disparity by diagnosis is much greater at the upper end of the scale. A hypertension visit to a salaried internist in a large OPD costs 42 percent more than the same visit for an upper respiratory infection. Conversely, a visit to a GP in a small private practice for hypertension costs only 8 percent more than the $30.36 it costs for an upper respiratory infection. Both these factors have strong implications for reimbursement policy.

Conclusions

This project has investigated the reasons why an ambulatory care visit costs substantially more in the OPD than it does in private practice. It has made an attempt to attach actual figures to all components of the visit, including physician time, ancillary services, and the direct and indirect costs of the setting in which the service is performed.

Based upon the work done under this grant, the important components of the cost differential are the diagnosis, the specialty of the physician seen, whether the visit is in the OPD or in private practice, and the size of the setting. While we have made a preliminary attempt to attach percentage figures to these factors, further research is clearly needed.

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APPENDIX A

Simplified Explanatory Model of Ambulatory Visit Groups (AVG's)

Mean cost of tests by site of practice

AVG	Private	Salaried in OPD	Resident in OPD	All Sites
1	25% $1.00 (21)*	25% $2.00 (2)	10% $1.00 (1)	24% $1.08 (24)
2	25% $2.00 (21)	25% $4.00 (2)	25% $2.00 (2)	25% $2.16 (25)
3	25% $3.00 (21)	25% $6.00 (2)	25% $3.00 (2)	25% $3.24 (25)
4	25% $4.00 (21)	25% $8.00 (2)	40% $4.00 (3)	26% $4.30 (26)
Actual mean	$2.50 (84)	$5.00 (8)	$3.00 (8)	$2.74 (100)
Expected mean	$2.70**	$2.70	$3.18	$2.74
	7.4% low	85.2% high	6.4% low	0

* The first number is the percent in the group, the second number the actual cost and the third number the actual number of observations in the group.

** Σ (.25 x 1.08) + (.25 x 2.16) + (.25 x 3.24) + (.25 x 4.30) = $2.70